Aragon 8008

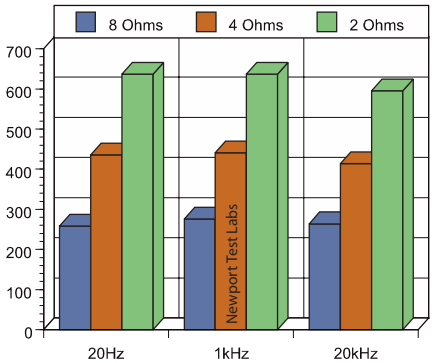
POWER AMPLIFIER

Don't you just love it when a beautiful form is also functional? Or, to put it the other way around, when a functional form is also beautiful? That's what Indy Audio Labs has achieved with the Aragon 8008. That distinctive 'V' slashed though the front panel is a very clever section of custom heatsinking that allows the heat generated by this 200-watt per channel amplifier (into 8Ω, it's rated at 400-watts per channel into 4Ω) to dissipate into the atmosphere without the need for fan assistance, even when the amplifier is mounted in an equipment rack.

THE EQUIPMENT

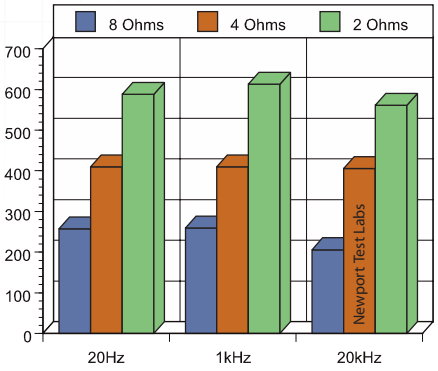
One thing you should know right away is that the Aragon 8008 that's available on the shelves in Australia now is not quite the same as the Aragon 8008 that was sold in the late 90s. It's a different beast entirely… or if not 'entirely different' then 'mostly different'.

According to Rick Santiago, CEO of Indy Audio Labs, which now builds the Aragon 8008 (in the USA, I should add, but see our breakout box 'Company History' for more information), the 'original' Aragon 8008 was a redesigned Aragon 4004 with updated transistors, an updated balanced input and improved heat dissipation. It had a single power transformer, with independent windings around a common core and eight output devices per channel. It was known as the 'ST' ('Single Transformer') model. There was later a 'BB' version of the 8008 that had two separate transformers, and could be ordered with either balanced or unbalanced inputs, and which had 12 output devices per channel. The ST and BB were sold concurrently.



Power Output: Single channel driven into 8-ohm, 4-ohm and 2-ohm non-inductive loads at 20Hz, 1kHz and 20kHz.

After Klipsch purchased Mondial, it brought out a Mark II dual-transformer version of the 8008 with upgraded cosmetics, over-temp protection, and balanced and unbalanced inputs, designed by Mike Kusiak who, with Adam Gershon, had been responsible for the original design. This new version of the 8008 from Indy Audio Labs was developed by IAL's chief engineer, Joe Land (who won the 2012 Eaton Award for Design Excellence from Purdue University).

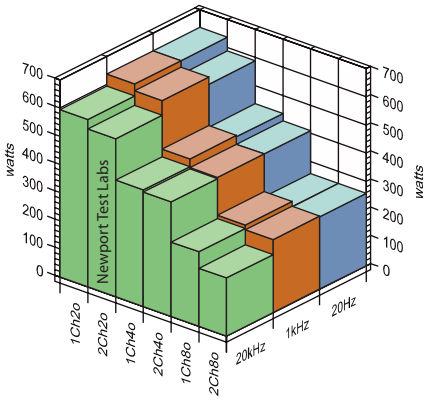


Power Output: Both channels driven into 8-ohm, 4-ohm and 2-ohm non-inductive loads at 20Hz, 1kHz and 20kHz.

One of the main differences between Land's new design and that of Kusiak's is that whereas Kusiak still used Toshiba 2SA1302/2SC3281 transistor pairs in the output, Land uses MJL3281A/MJL1302AG transistor pairs, which are ultra-modern, high-current NPN/PNP gain-matched devices with an exceptional safe operating area. The MJL devices are made by ON Semiconductor. (Given the history of the 8008, I think Indy Audio Labs could have prevented a lot of model number confusion by naming the 8008 something else entirely, but I guess it wanted to capitalise on the popularity of the different 8008 variants.)

The new 8008 has a 12V remote trigger circuit, an RS232 DB9 connector so the amplifier can be remotely controlled by an external system controller (Crestron etc) and an Ethernet port that allows the amplifier to connect to a network, after which it can be controlled using Aragon's proprietary Enhanced Ethernet Control technology (E2C). Basically, once the 8008 is connected via Ethernet to a network, you can use any device connected to the network—computer, tablet, Smartphone, etc—to control and monitor it. So you can, using a standard browser, switch the 8008 on or off, mute and un-mute the speaker outputs, and monitor the temperature of each channel's heatsink. The muting circuitry is completely unusual (I've never seen its type before), in that you can mute the left and right channel outputs simultaneously or individually, which Aragon suggests could be '*useful for simple troubleshooting and set-up of individual channels, particularly in a multi-channel surround set-up.*' The other application for E2C is to allow remote monitoring and diagnostics by Aragon itself or, if your Aragon is part of a custom home install system, by the systems integrator who installed it in your home.

Remove the external casing from the 8008 (though I would advise that you do not do this, because there are some dangerously high voltages inside—and will be even for a considerable length of time after the amplifier has been switched off and disconnected from the mains power—but also because the casing itself is also very difficult to re-fit) will reveal two, two massive 0.5kVA bifilar-wound toroidal transformers, stacked one atop the other, that feed pairs of 35-amp diode bridge rectifiers and then 140,000µF of capacitance in the shape of four huge 35,000µF electrolytic capacitors (unmarked). The output devices are six MJL3281A/MJL1302AG pairs, as mentioned previously. There are no monolithic integrated circuits in the signal path, which is d.c.-coupled from input to output, and zero-offset is maintained by a Land-designed servo circuit. The control and monitoring sub-systems are integrated to provide thermal, short-circuit and over-current protection and do not impact on the signal path. The speaker outputs are bespoke paralleled high-current, 60-amp gold-plated binding posts that accept banana plugs, stripped wire, pins or spade connectors. The posts are mounted on 19mm centres, so you can use dual Pomona plugs if you prefer. Aragon provides insulated gold-plated



Power Output: Single and both channels driven into 8-ohm, 4-ohm and 2-ohm non-inductive loads at 20Hz, 1kHz and 20kHz. [Aragon 8008 Amplifier]

RCA inputs for the unbalanced inputs, and professional-grade XLR connectors for the balanced inputs. Two aluminium finishes are available: brushed alloy and anodised black. I was very happy with the bright finish of our review loaner until I saw a photograph of the black anodised version, after which I changed allegiances!

IN USE AND LISTENING SESSIONS

The excellent heat management means that positioning the Aragon 8008 isn't as critical as it would be with some other high-power, non-fan-assisted power amplifiers, but you should still exercise the usual cautions, and make certain the bottom of the amplifier is sitting well clear of whatever it's sitting on, to ensure a constant flow of air under the amplifier and then up through the 'chimneys' created by the V-shaped heatsink.

The in-rush current into the Aragon's power supply is so great that I think I'd be recommending you put in a separate 240V power circuit for it, if you haven't done so already. Even the internal circuits feel the load, with the amplifier switching on with an almost-physical 'crump'. Aragon makes significant mention in its manual that you should switch all components connected to the 8008 on first, and then turn the amplifier on last of all. Heed this sensible advice!

ARAGON 8008
POWER AMPLIFIER

Brand: Aragon
Model: 8008
Category: Dual Mono Power Amplifier
RRP: $5,999
Warranty: Five Years
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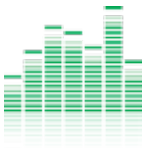
Broadmeadows VIC 3047
(08) 8338 5540
sales@powermove.com.au
www.powermove.com.au



- Hugely powerful
- Drives any load
- Superb sound
- Ethernet control

- Front-panel controls
- Switch-on thump
- Volume control

LAB REPORT

Readers interested in a full technical appraisal of the performance of the Aragon 8008 Power Amplifier should continue on and read the LABORATORY REPORT published on page 24. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

Lab Report on page 24

However, the amplifier does not instantly spring into life. There's around a six second pause while the amplifier checks its own internals, and that the speaker terminals are not short-circuited, during which time the light around the power button flashes orange. Once everything has been checked and the internal circuitry is stable, the amplifier becomes fully operational, which is indicated by the light around the power button glowing a steady blue colour.

I started listening at low volume, because low volume levels are typically the *Achilles' heel* of very high-power amplifiers, because in order to be able to deliver high power output, some of the subtle niceties are lost at the lowest listening levels. The good news is that this paradigm turned out not to be the case with the Aragon 8008. At low levels, the sound was so sweet and pure that I could have been listening to a low-powered Class-A amplifier. Equally important, the 'flow' of the music was still exactly right, as was evidenced to me by listening to the Kreutzer Quartet's new album, Unfold, now available on the Move Label. On it, the quartet plays confronting music from modernist Australian composers Don Banks, Nigel Butterley, Richard Meale and Felix Werder. All the compositions depend on perfect timing, yet timing that is mostly organic rather than dictated by the music… as evidenced by Butterley's String Quartet (1965) where in the second movement, there are no bar lines, and the players are directed that 'the upper parts are independent of each other, but each player should relate his part fairly closely to the cello part. But it isn't only the organic timing that the Aragon 8008 delivers perfectly: the very low-level sounds of single strings dying away into the acoustic—particularly on Meale's String Quartet No 1 (1974). This is in no small part aided by the absolutely superb recording by Johnathan Haskell (Astounding Sounds) who used the Aldbury Parish Church in Hertfordshire for the purpose. All my listening was on 16-bit/44.1kHz CD (Move 3371) but apparently a 192/24 version is also available from Move, and includes Banks' *Sequence* (for solo cello). If you listen to the samples of this disc that are available on Move's website (www.move.com.au) I would recommend that you persevere, because once you get 'into' what the composers are getting at, you'll be mesmerised and haunted by all the tracks… and, as I said, the sound capture achieved by Haskell is brilliant!

For a bit of oomph, so that I could give the power capabilities of the Aragon 8008 a real try-out, I really wound the wick up on Louisa Rose Allen's debut album 'Glorious' (which cataloguing programs seem to want to label as *Synthpop*) and began to fear for my bass drivers, so overblown are the kick drums and synth bass notes. (If you're looking for this album, for some reason Allen calls herself Foxes, so the album is known as 'Foxes Glorious'—or, rather, the three albums are collectively known as this, since there's a standard CD, a deluxe CD (signed) and a limited edition vinyl version…or I should say 'was' because it appears the deluxe and vinyl versions are sold out…). I can see why they sold out, because despite the (IMO) completely over-the-top engineering and production, the songs (all written by Louisa with various collaborators) are totally engaging. It became a regular spinner for me, even after I'd returned the Aragon, so much so that I'd spend the money all over again for an 'unplugged' version of exactly the same album.

Back with some of my totally familiar well-recorded CDs of acoustic instruments I was able to judge that unlike some solid-state amps, this new version of the 8008 is not 'clinical' at all, but instead comes across as almost totally neutral in sonic character… though I say 'almost totally neutral' because I often detected a hint of mellow softness, as if the Aragon was thinking about being a valve amp, but couldn't commit. And why should it, considering the tremendous resolving power it exhibited, both in terms of dynamics and pacing, but also in terms of soundstaging. It's clearly superior-sounding in all these important musical factors. It also imbues in the highest frequencies that almost ethereal sense of 'air' that frees music from any circuit-bound shackles, so it sits perfectly in the environs of your listening room. No doubt about it, this new Aragon 8008 is a wonderfully musical amplifier.

CONCLUSION

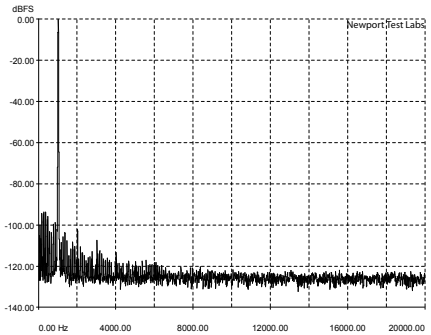
Indy Audio Labs' newly re-vamped Aragon 8008 is everything you could possibly wish for in a two-channel audiophile power amplifier… plus you're getting true high-end performance at a distinctly unhigh-end price which is no mean feat when you consider how much high-tech interfacing has been built in, and also that the amplifier is made entirely in the good ol' USA. *greg borrowman*

LAB REPORT ON PAGE 24

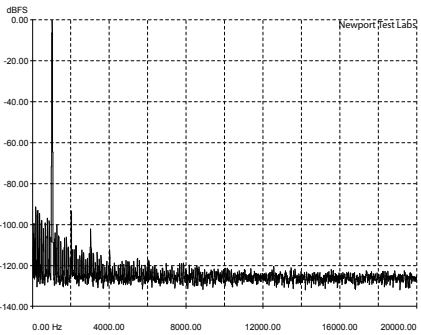
COMPANY HISTORY

In December 2008, Indy Audio Labs (so-called because it's based in Indianapolis, Indiana) was founded by Rick Santiago and Ted Moore, after they'd purchased rights to the Aragon and Acurus brands from Klipsch, which itself had acquired these two brands when it purchased a company called Mondial Designs eight years earlier. Mondial Designs itself was founded by Paul Rosenberg and Tony Federici in the 80s in Dobbs Ferry, New York. One of its most famous designs was the Aragon 4004, the circuit for which was designed by Dan D'Agostino, though the industrial design was by Robbii Wessen. Home Theatre Magazine said the 4004 was 'one of the single best power amps built in audiophile history.' Mondial introduced the Acurus brand in 1993 as a more affordable alternative to Aragon. Both Santiago and Moore previously worked as engineers for Klipsch. The company's mission statement is to build 'next-generation, made-in-America amplifiers to better meet the needs of today's uncompromising listeners while remaining true to the technical attributes the original founders of Mondial held in high esteem—performance, reliability, value.'

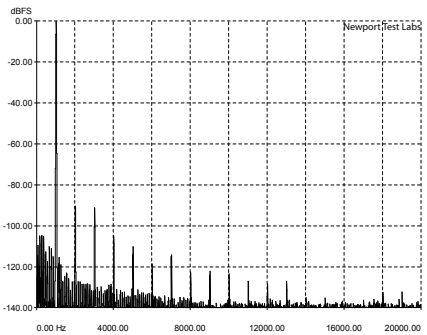
CONTINUED FROM PAGE 22



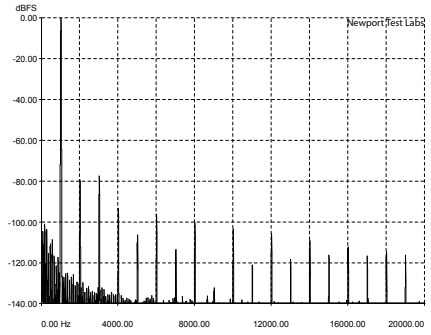
Graph 1: Total harmonic distortion (THD) at 1kHz at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB. [Aragon 8008 Amplifier]



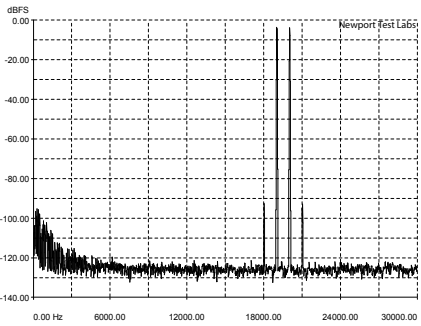
Graph 2: Total harmonic distortion (THD) at 1kHz at an output of 1-watt into a 4-ohm non-inductive load, referenced to 0dB. [Aragon 8008 Amplifier]



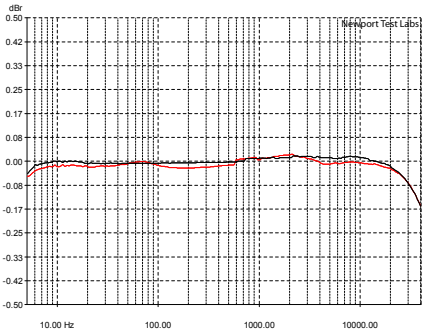
Graph 3: Total harmonic distortion (THD) at 1kHz at rated output (200 watts) into an 8-ohm non-inductive load, referenced to 0dB. [Aragon 8008 Amplifier]



Graph 4: Total harmonic distortion (THD) at 1kHz at rated output (400 watts) into a 4-ohm non-inductive load, referenced to 0dB. [Aragon 8008 Amplifier]



Graph 5: Intermodulation distortion (CCIF-IMD) using test signals at 19kHz and 20kHz, at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB. [Aragon 8008 Amplifier]



Graph 6: Frequency response of line input at an output of 1-watt into an 8-ohm non-inductive load (black trace) and into a combination resistive/inductive/capacitive load representative of a typical two-way loudspeaker system (red trace). [Aragon 8008 Amplifier]

TEST LABORATORY RESULTS

On *Newport Test Lab's* bench, connected to laboratory-grade non-inductive 8Ω power resistors, the Aragon 8008 delivered 259-watts (24.1dBW) per channel continuous, with both channels driven, when delivering a 1kHz test tone, and 276-watts (24.2dBW) into a single channel under the same conditions. Power output dropped slightly when the test frequency was moved upwards to 20kHz, but the amplifier still exceeded its specification, delivering 206-watts (23.1-dBW) both channels driven and 264-watts (24.2dBW) per channel when a single channel was driven. Performance at very low frequencies was outstanding, with the Aragon 8008 delivering 257-watts (24.0dBW) both channels driven with a 20Hz test signal, and 258-watts (24.1dBW) per channel when one channel was driven.

The Aragon 8008 was equally adept at handling lower impedance loads, as shown in the tabulated results—and bar graphs—accompanying this review. I will save space by letting you read the power output at the frequency extremes, but will note here that the 8008 delivered 410-watts (26.1dBW) per channel, both channels driven into 4Ω loads, and 613-watts (27.8dBW) per channel both channels driven into 2Ω. This is self-evidently an extremely powerful amplifier that is totally comfortable driving very low impedances.

It's also an exceedingly wide-band amplifier, as you can see from the tabulated frequency responses. The Aragon 8008's frequency response was measured as extending from less than 1Hz up to 260kHz ±0.5dB, and less than 1Hz to 330kHz ±1.5dB. Across the audio band, the response was phenomenally flat, evidenced by the vertical scale on Graph 6, where the total vertical scale represents just a single decibel, and the horizontals are just 0.08dB apart. As you can see, the Aragon 8008's response into an 8Ω resistive load (the black trace on the graph) tracks the 0.00dB reference line almost exactly, to be 20Hz–20kHz ±0.02dB. The red trace shows the Aragon's frequency response into a load that simulates that of a typical two-way loudspeaker system, and it's very nearly identical to the response into a resistive load.

Aragon 8008 Power Amplifier – Power Output Lab Tested

Channel	Load (Ω)	20Hz (watts)	20Hz (dBW)	1kHz (watts)	1kHz (dBW)	20kHz (watts)	20kHz (dBW)
1	8 Ω	258	24.1	276	24.4	264	24.2
2	8 Ω	257	24.0	259	24.1	206	23.1
1	4 Ω	436	26.3	442	26.1	414	26.1
2	4 Ω	410	26.1	410	26.1	406	26.0
1	2 Ω	637	28.0	637	28.0	595	27.7
2	2 Ω	588	27.7	613	27.8	561	27.4

Note: Figures in the dBW column represent output level in decibels referred to one watt output.

Aragon 8008 Power Amplifier – Laboratory Test Results

Test	Measured Result	Units/Comment
Frequency Response @ 1 watt o/p	<1Hz – 260kHz	–1dB
Frequency Response @ 1 watt o/p	<1Hz – 330kHz	–3dB
Channel Separation (dB)	96dB / 97dB / 82dB	(20Hz / 1kHz / 20kHz)
Channel Balance	0.0448	dB @ 1kHz
Interchannel Phase	0.01°/0.00°/0.69°	degrees (20Hz / 1kHz / 20kHz)
THD+N	0.001% / 0.004%	@ 1-watt / @ rated output
Signal-to-Noise (unwghted/wghted)	75dB / 80dB	dB referred to 1-watt output
Signal-to-Noise (unwghted/wghted)	93dB / 97dB	dB referred to rated output
Input Sensitivity (Unbalanced)	238mV / 1.65mV	(1-watt / rated output)
Input Sensitivity (Balanced)	118mV / 828mV	(1-watt / rated output)
Output Impedance	0.01Ω	2.8503(L)/2.8531(OC)/8Ω
Damping Factor	800	@1kHz
Power Consumption	4.33 / 148	watts (Standby / On)
Power Consumption	194 / 403	watts at 1-watt / at rated output
Mains Voltage Variation during Test	240 – 246	Minimum – Maximum
Heatsink Temperature (Degrees C)	56°C	At hottest point

CONTINUED ON PAGE 26

Channel separation was outstanding right across the audio frequency band, hovering around 96dB from 20Hz right up to 10kHz, after which it fell slightly, to be 82dB at 20kHz. Channel balance was near-enough to perfect at 0.0448dB (at 1kHz) and remained as good right across the band. The same was true, too, for inter-channel phase, which was absolutely perfect at 1kHz, only 0.01° in error at 20Hz (small enough to fall within measurement error limits) and only 0.69° out at 20kHz.

The signal-to-noise ratios of the Aragon 8008, although excellent, were not as high as I might have expected them to be, especially considering the amplifier's high power output, which gives it a hand up when considering the S/N referred to rated output. At an output of one watt, the result was 75dB unweighted, improving to 80dB with A-weighting. Referred to rated output, the figures improved to 93dB unweighted and 97dB with A-weighting. What little noise there was in the output was low-frequency noise, as evidenced by the various distortion spectrograms accompanying this test report.

Harmonic distortion with 8Ω loads, at an output of one watt, was virtually non-existent, as you can see from Graph 1. Just visible on this graph is a second harmonic at –102dB (0.0007% THD), a third harmonic at –108dB (0.0003% THD), and a fourth at –115dB (0.0001% THD). If there were any more harmonics, they are not visible above the noise floor which, as you can see from the graph, is more than 120dB down (0.0001% THD) from 4kHz upwards. Distortion increased slightly when driving 4Ω loads at the same output, with the second harmonic increasing to –94dB (0.0019% THD), the third to –103dB (0.0007% THD) while the fourth remained at –115dB (0.0001% THD).

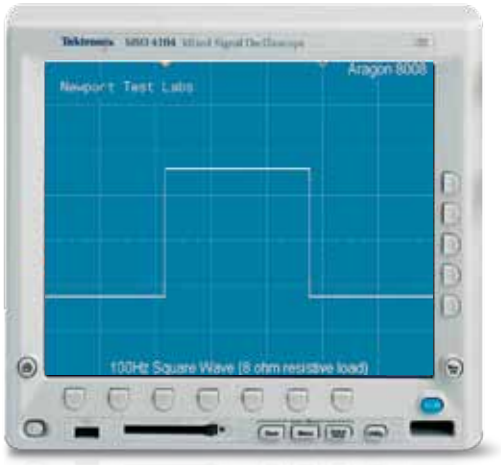
Harmonic distortion increased when the Aragon 8008 was delivering its rated output power, which is shown in Graph 3 (THD at 200-watts into 8Ω) and Graph 4 (THD at 400-watts into 4Ω). In both cases you can see that the noise floor is more than 120dB down above 1kHz, and falls near to being 140dB down above 4kHz. At the extreme left of both graphs, the noise is higher, accounting for the tabulated figures, which are measured wideband. As for the distortion being 'higher', it's really only relative. On Graph 3, second and third harmonic distortion components (HDL2 and HDL3) are both around –90dB (0.0031% THD), with a fourth at –105dB (0.0005% THD) and a fifth at –115dB. As you can see, higher harmonic components are visible, but mostly more than 120dB down.

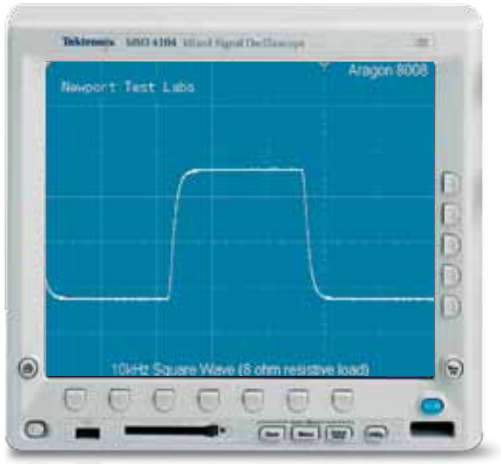
Intermodulation distortion, measured here using the CCIF twin-tone method, was outstandingly low. First, the difference tone one usually expects to see at 1kHz (1kHz being the difference frequency between the two test tones at 19kHz and 20kHz) is completely absent, which is a great result. If it is there, but is buried in the noise floor, it's still more than 120dB down (0.0001%). Up alongside the test tones, where I'd normally expect to see a 'skirt' of sidebands, there are only two: one at 18kHz and the other at 21kHz, both of which are around 93dB down (0.0022%). I can't remember seeing such a good result from any other amplifier.

As you'd expect given the frequency response of the Aragon 8008, its performance when tested with square waves was superb. The waveform with a 100Hz square wave is perfect, as is the 1kHz square wave. Some rounding is evident on the 10kHz square wave, but at this high frequency, this is expected. Performance with a highly capacitative load was exemplary, as you can see. There's only five cycles of ringing, and even the initial overshoot is very well-damped. This, combined with its extremely high damping factor (800 at 1kHz) means the Aragon will drive the most demanding of loads and will be completely stable into highly reactive speakers, including electrostatics.

Mains power consumption in standby mode is 4.33-watts, not even close to the Australian government's 1-watt mandate, and the Aragon 8008 pulls 148-watts whenever it's switched on, so I'd recommend always leaving it switched to standby until you plan on using it. If you're not using it for long periods of time, I'd turn the power off at the mains socket.

Overall, I found the Aragon 8008 to be an absolutely outstanding power amplifier.





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